REMARKS

Claims 1-20 are pending in this application. Claims 2, 3, 11 and 19 are canceled without prejudice or disclaimer, and claims 1, 4, 6, 12, 14-17 and 20 are amended herein. Upon entry of this amendment, claims 1, 4-7, 9, 10, 12-18 and 20 will be pending. Entry of this amendment and reconsideration of the rejections are respectfully requested.

No new matter has been introduced by this Amendment. Support for the amendments to the claims is detailed below.

Claim 2 is objected to under 37 CFR §1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. (Office action paragraph no. 1)

The objection is moot in view of the cancellation of claim 2 without prejudice or disclaimer.

Claim 4 is objected to because of the following informalities. In lines 5 and 9, replace "and" with "or" unless the claim is drawn to a (co)polymer having all three monomer units (1), (2), and (3). (Office action paragraph no. 2)

The objection is overcome by the amendment to claim 4. The phrase "the group consisting of" has been added in the last clause of claim 4, to recite standard Markush wording to clarify the selection from the alternatives (1), (2) and (3).

Claim 4 is objected to under 37 CFR §1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. (Office action paragraph no. 3)

The objection is overcome by the amendment to claim 1. The first clause of claim 4 after the preamble, which was redundant to the recitation of claim 1, has been deleted.

Claim 6 is objected to because of informalities. The acyloxyl group (RC(=O)O-) is not a crosslinkable functional group defined by formulas [1], [2], [4], or [5]. (Office action paragraph no. 4)

The objection is overcome by the amendment to claim 6. Claim 6 has been amended to delete the words "an acyloxyl group."

Claim 10 is objected to because of informalities. In line 3, replace "and" with "or". (Office action paragraph no. 5)

The objection to claim 10 is respectfully traversed. The phrase at issue is "at least one of ... [1], [2], [4] and [5] ...." Applicant submits that the conjunction "and" is grammatically correct here.

Claim 12 is objected to because of informalities. It is not clear whether the composition necessarily contains the claimed feature since claim 4, from which claim 12 depends, is drawn to a selection of monomers. (Office action paragraph no. 7)

The objection is overcome by the amendment to claim 12. Claim 12 has been amended to replace "a monomer containing a hydroxylgroup as a crosslinkable functional group" with -- (3) said monomer having a hydroxylgroup as a crosslinkable functional group--, so as to clarify which monomer is being recited.

Claims 14-16 are objected to because of informalities. Claims recite the limitation. "Having at least one oxygen atom." This limitation appears redundant since both types of monomer necessarily contain at least one such oxygen atom. It is not clear what embodiment is being defined by the claim language. (Office action paragraph no. 8)

Claims 14, 15 and 16 have been amended as follows: "a monomer containing a hydroxyl group having at least one oxygen atom other than the oxygen atom of the hydroxyalkyl group."

Claim 15 is objected to because of informalities. It is not clear whether the composition necessarily contains the claimed feature since the monomers of claim 14, from which claim 15 depends, are presented in the alternative form. (Office action paragraph no. 9)

Applicant is uncertain regarding the Examiner's point. Claim 15 is limiting monomer (III) to one of the two alternatives recited in claim 14. However, to more clearly indicate that one of the two alternatives is being selected, claim 15 is amended as follows: "wherein the monomer [[of]] (III) ~~in the crosslinked organic polymer compound has~~ is the monomer containing a hydroxyalkyl group containing

at least one oxygen atom other than the oxygen atom of the hydroxyalkyl group and a polymerizable double bond."

Claim 20 is rejected under 35 U.S.C. §112, first paragraph, as failing to comply with the enablement requirement. (Office action paragraph no. 11)

The rejection is overcome by the amendment to claim 20. Claim 20 has been amended to recite reacting the composition of claim 1 with "a primary alcohol."

Claims 1-7 and 9-20 are rejected under 35 U.S.C. §112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. (Office action paragraph no. 13)

The Examiner states that there is no antecedent basis for "the catalyst" in claim 1, line 2, or for "the palladium catalyst" in claim 2.

The rejection is overcome by the amendments to the claims. The rejection is moot for claims 2 and 3, which have been canceled without prejudice or disclaimer. Claim 1 has been amended to replace "said catalyst" in line 2 with "said Pd(0)," thereby referring to the Pd(0) recited earlier in line 2. The Pd(0) in line 2 of claim 1 is carried on the crosslinked polymer and does not have a ligand, and claim 1 has been amended to recite "Pd(0) having no ligand" to clarify this.

"A palladium catalyst" in claim 1, line 5, is a starting material and has a ligand.

Claims 1-4, 6, 7, 9, 10, 12, and 13 are rejected under 35 U.S.C. §102(b) as being anticipated by An et al. (*Polymers for Advanced Technologies*, 1996, 7, 652-656). (Office action paragraph no. 17)

The examiner states that:

> "the catalyst of An et al. is substantially the same as that recited in the instant claims, namely, a catalyst comprising crosslinked polymer and palladium catalyst physically carried on said crosslinked polymer and wherein the polymer is obtained by polymerizing a monomer of type(3), represented by structure[5]."

The rejection is overcome by the amendment to claim 1. Claim 1 has been amended to incorporate the limitation of claim 11 (which has been canceled herein): "wherein all of monomers having a crosslinkable functional group and a polymerizable double bond represented by the general formulas [1], [2], [4] and [5], and of monomers having a polymerizable double bond represented by the general formula [6], have an aromatic ring."

Applicant further argues that claim 1 and the dependent claims of claim 1 are also not obvious over An et al. That is, the carrier disclosed in An et al. is only phosphorylated poly(vinyl alcohol) [P-PVA]. An et al. neither discloses nor suggests the carrier disclosed in amended claim 1. Moreover, the effects of the palladium catalyst composition of the present invention are unexpected based on the disclosure of An et al.

In particular, An et al. discloses only the comparative results of catalyst activity using SiO_2-crosslinking P-PVA, SiO_2-P-PVA and SiO_2-PVA, and neither discloses nor suggests repeated use of the

catalyst. Therefore, the effect of the palladium catalyst of the present invention, of keeping its activity even after repeated us, is unexpected over An et al.

Claims 1, 4-7, 9, 10, 19-18 and 20, as amended, are therefore not obvious over An et al.

Claims 1-7, 9, 10, 12, and 13 are rejected under 35 U.S.C. §102(b) as being anticipated by Charmot et al. (U.S. 4,943,482). (Office action paragraph no. 18)

The Examiner states that:

> "Charmot et al. discloses particles of crosslinked polymer metallized on the surface with at least one zero valent metal. The polymer comprising 20-70wt% of at least one noncomplexing monoethylenic monomer and up to 10wt% of at least one ethylenically unsaturated carboxylic acid .... An exemplary metal present on the surface of the polymer particle is palladium .... The catalyst of Charmot et al. is substantially the same as that recited in the instant claims ...."

The rejection is overcome by the amendment to claim 1. As noted above, claim 1 has been amended to incorporate the limitation of canceled claim 11.

Moreover, claim 1 and the dependent claims of claim 1 are also not obvious over Charmot et al. The composition in Charmot is used for the preparation of electrically conductive adhesive and paints in microconnections and as waveguide (col. 4, lines 25-28). The Charmot et al. reference neither teaches nor suggests use of the catalyst of the composition. Therefore, there is no suggestion in Charmot et al. that a composition of the present invention could be used as a catalyst, and in particular, that the composition

would have useful catalyst effects in the oxidization reaction of an alcohol and the substitution reaction at the allyl position.

Claims 1, 4-7, 9, 10, 12 and 13, as amended, are therefore not obvious over Charmot et al.

Claims 1-7 and 9-17 are rejected under 35 U.S.C. §103(a) as being unpatentable over Okamoto et al. (U.S. 6,716,792 / U.S. 2002/0045708; patent relied upon for indexing). (Office action paragraph no. 19)

The Examiner states that:

> "Okamoto et al. discloses a metallic Lewis acid composition comprising the metallic Lewis acid carried on a crosslinked polymer formed by mixing non-crosslinked polymer with metal compound and then crosslinking the polymer, and metallic Lewis acid includes palladium which is bound to an anion atom such as halogen, sulfonic acid cyanide, i.e., as Pd(II) or an atom group such as ammonium and carbonyl, i.e., as Pd(0). Okamoto et al. does not direct the reader to use Pd(0) per se, however, the person of ordinary skill in the art would have ultimately made the claimed catalyst composition."

However, in the composition of Okamoto et al., metal oxide or metallic Lewis acid "is carried under homogeneously dispersed state" on the cross-linked polymer compounds (column 21, lines 23-26, in Okamoto et al.), that is, the metal is carried on the carrier in the state of metal oxide or metallic Lewis acid. On the other hand, in the palladium catalyst composition of the present invention, Pd(0) is carried directly on the crosslinked polymer, that is, the metal alone is carried on the cross-linked polymer (lines 5-14 on page 4 of the present specification). This is caused by using the specific crosslinked polymer, namely, by using the crosslinked polymer obtained by polymerizing 1)(1) a glycidyl compound having an epoxy

group as a crosslinkable functional group, selected from the group consisting of a glycidyl ether and a glycidyl ester represented by the general formulas [1] and [2], respectively; (2) a monomer having a carboxyl group as a crosslinkable functional group, represented by the general formula [4]; or (3) a monomer having a hydroxyl group as a crosslinkable functional group, represented by the general formula [5] and optionally 2) a monomer having a polymerizable double bond is represented by the general formula [6]. Among above crosslinked polymer, all of monomers polymerized preferably have an aromatic ring (lines 1-8 on page 27 in the present specification). The reason for the effect of this limitation is not clear, but Applicants think the aromatic rings in the straight chain organic polymer work as substitute of the ligand after Pd(0) is released from the ligand. The fact that alone Pd(0) is carried on the crosslinked polymer was found by the present inventor for the first time. Therefore, this result is not expected from Okamoto et al. since Okamoto et al. only discloses a composition carrying metal oxide or metallic Lewis acid, which is not a metal alone.

Furthermore, when a person having ordinary skill in the art tries to carry the palladium having ligand on the carrier according to Okamoto et al., this person would carry the palladium having a ligand on the carrier in the same way as the metal oxide or metallic Lewis acid is carried. Such a catalyst composition carrying palladium catalyst having a ligand cannot have the catalyst effect in the oxidation reaction. As disclosed in lines 16-19 on page 49 in the specification of the present invention, when triphenylphosphine is present in a system of a reaction using an allyl carbonate, a substitution reaction at the allyl position proceeds, while an oxidation reaction does not. Thus, the person having ordinary skill in the art would think

naturally that the palladium catalyst composition prepared according to Okamoto et al. cannot have the catalyst effect in an oxidation reaction using an allyl carbonate. However, the palladium catalyst of the present invention can have the effect even in the oxidation reaction using an allyl carbonate because it carries Pd(0) having no ligand. This is an unexpected result, and the catalyst effect in the oxidation reaction using an allyl carbonate is not expected from Okamoto et al.

That is, the effects of the present invention cannot be expected from Okamoto et al. Claims 1, 4-7, 9, 10, and 12-17 are not obvious over Okamoto et al.

Claims 18 and 19 are rejected under 35 U.S.C. §103(a) as being unpatentable over Okamoto et al. (U.S. 6,716,792 / U.S. 2002/0045708) in view of Kobayashi (JP 2002-253972). (Office action paragraph no. 20)

The Examiner states:

> "Okamoto et al. does not disclose synthetic utility of palladium based catalysts. Kobayashi discloses polymer encapsulated palladium catalysts prepared by homogenizing polymer and a palladium(0) complex much in the same manner as that described in the invention of Okamoto et al. The combination of references would have suggested to the person having ordinary skill in the art that the palladium catalyst of Okamoto is well suited for catalyzing allylic substitution. It also would have been obvious to the person having ordinary skill in the art to use a palladium phosphine complex, as per Kobayashi, in lieu of a palladium carbonyl complex suggested in Okamoto et al."

The rejection is moot for claim 19, which has been canceled without prejudice or disclaimer.

The rejection of claim 18 is respectfully traversed.

As discussed above regarding the rejection in Office action paragraph no. 19, when the person having ordinary skill in the art tries to carry palladium having a ligand on the carrier according to Okamoto et al., it is natural to think the palladium having ligand is carried on the carrier in the same way to carry metal oxide or metallic Lewis acid. Such a catalyst composition carrying palladium catalyst having ligand cannot have the catalyst effect in the oxidation reaction, namely, the oxidation reaction using an allyl carbonate does not proceed because a ligand is present in a system of a reaction.

Kobayashi et al. discloses the preparation of the palladium catalyst composition starting from palladium coordinated by phosphine ligand, but the palladium catalyst composition of Kobayashi carries the palladium having the phosphine ligand. Thus, when such a palladium catalyst is used in the oxidation reaction using an allyl carbonate, the reaction cannot proceed because ligand is present in a system of a reaction.

Therefore, though Kobayashi et al. discloses the preparation of a palladium catalyst composition using a phosphine complex, it is not expected from Okamoto et al. and Kobayashi et al. that the palladium catalyst composition obtained by the method of claim 18 does not have a ligand. It is also not expected that the palladium catalyst composition would have a catalyst effect in the oxidation reaction using an allyl carbonate.

Therefore, the method for producing the composition of claim 18 is not obvious over Okamoto et al. and Kobayashi et al., taken separately or in combination.

Claims 1-7, 9, 10, 12-15, and 17 are rejected under 35 U.S.C. §103(a) as being unpatentable over Tieke et al. (U.S. 5,045,436) in view of Cluff et al. (U.S. 4,548,963). (Office action paragraph no. 21)

The rejection is overcome by the amendment to claim 1. As discussed above, claim 1 has been amended by adding the limitation of claim 11.

Claims 18 and 19 are rejected under 35 U.S.C. §103(a) as being unpatentable over Tieke et al. in view of Cluff et al., and further in view of Kobayashi (JP 2002-253972). (Office action paragraph no. 22)

The Examiner states:

> "Tieke et al. teaches use of palladium as oxidant for redox reaction, but does not disclose further synthetic utility of palladium based catalysts. Kobayashi discloses polymer encapuslated palladium catalysts prepared by homogenizing polymer and a palladium(0) complex much in the same manner as that described in the invention of Tieke et al. The combination of references would have suggested to the person having ordinary skill in the art that the palladium catalyst of Tieke is well suited for catalyzing allylic substitution. It also would have been obvious to the person having ordinary skill in the art to use a palladium phosphine complex, as per Kobayashi, in lieu of a palladium carbonyl complex suggested in Tieke et al."

The rejection is moot for claim 19, which has been canceled without prejudice or disclaimer.

The rejection of claim 18 is respectfully traversed.

The Examiner states that Tieke teaches the composition containing a dibenzalacetone Pd(0) complex and at least one organic polymer.

However, the composition of Tieke carries a Pd(0) **complex** and does not carry Pd(0) alone. The palladium catalyst composition of the present invention is different from the composition of Tieke because in claim 18, the palladium catalyst composition carries Pd(0) itself. Therefore, the effect by the palladium catalyst composition obtained by the method of claim 18, which has such a specific structure, cannot be expected from Tieke.

Furthermore, the examiner states that Tieke discloses that upon heating, the ligands of the palladium complex are decomposed, resulting in deposition of elemental palladium on the polymer.

However, Tieke et al. discloses in column 7, lines 21-23: "the complex decomposes, thereby liberating finely dispersed, catalytically active Pd(0)," namely, Pd(0) is liberated from complex to activate. This is the different from the present invention because the palladium catalyst composition of the present invention has the catalyst activity in the state of carrying Pd(0) on the carrier. The palladium catalyst composition of the present invention has the effect of repeated use because of not releasing Pd(0) in the reaction. The composition of Tieke cannot have the effect of repeated use. In fact, Tieke can be considered to teach away from the present invention in this regard. Therefore, the effect of repeated use of the palladium catalyst composition obtained by the method of claim 18 cannot be expected from Tieke et al. Even if the composition of Tieke is used for the catalyst on the basis of Kobayashi et al., the effect of keeping activity after repeated use cannot expected, for the reason discussed above.

Furthermore, Kobayashi et al. discloses the preparation of the palladium catalyst composition starting from palladium coordinated by phosphine ligand, but the palladium catalyst composition of

Kobayashi et al. carries the palladium having the phosphine ligand. In contrast, in the present invention, although starting materials include palladium ligand complex, the finished product (the palladium catalyst composition of the present invention) carries Pd(0) **having no ligand**. That is, the finished products are different in Kobayashi et al. and the present invention. Thus, when the palladium catalyst composition of Kobayashi is used in the oxidation reaction using an allyl carbonate, the reaction cannot proceed because a ligand is present in a system of a reaction. Therefore, the catalyst effect in the oxidation reaction of the palladium catalyst composition obtained by the method of claim 18 is not expected from any combination of Tieke, Kobayashi and Cluff.

Therefore, the method of claim 18 is not obvious over Tieke, Kobayashi and Cluff, taken separately or in combination.

Claim 20 is rejected under 35 U.S.C. §103(a) as being unpatentable over Tieke et al. in view of Cluff et al., and further in view of Kluytmans et al. (Catalysis Today, 2000, 57, 143-155). (Office action paragraph no. 23)

The Examiner states:

> "Tieke et al. teaches use of palladium as oxidant for redox reaction, but does not disclose further synthetic utility of palladium based catalysts. Kluytmans et al. discloses use of supported palladium catalyst for carrying out oxidation of secondary alcohols to their corresponding ketones. The combination of references would have suggested to the person having ordinary skill in the art that the palladium catalyst of Tieke is well suited for catalyzing oxidation of alcohols."

As mentioned above in regard to the rejection in Office action paragraph no. 22, the effect of repeated use of the palladium catalyst composition of the present invention is an unexpected effect. Therefore, even if Tieke et al. is combined with Cluff et al. and Kluytmans et al., the effect of repeated use cannot be expected.

Therefore, the method for performing an oxidization reaction of alcohol of claim 20 is not obvious over Tieke et al., Cluff et al., and Kluytmans et al., taken separately or in combination.

Claims 1-7, 9, 10, 12, 13 and 17-20 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1, 2, and 5-12 of copending application no. 10/590,206. Claims are directed to an invention not patentably distinct from claims of commonly assigned 10/590,206 for the same reasons elucidated in the previous paragraph. (Office action paragraphs no. 25-26)

Claims 1-4, 6, 7, 9, 10, 11, 13-15, 17 and 18 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-15 of copending application no. 10/592,138. Claims are directed to an invention not patentably distinct from claims of commonly assigned 10/592,138 for the same reasons elucidated in the previous paragraph. (Office action paragraphs no. 27-28)

Reconsideration of these provisional obviousness-type double patenting rejections is respectfully requested in view of the amendments to the claims.

If, for any reason, it is felt that this application is not now in condition for allowance, the Examiner is requested to contact the applicants' undersigned agent at the telephone number indicated below to arrange for an interview to expedite the disposition of this case.

In the event that this paper is not timely filed, the applicants respectfully petition for an appropriate extension of time. Please charge any fees for such an extension of time and any other fees which may be due with respect to this paper, to Deposit Account No. 01-2340.

Respectfully submitted,

KRATZ, QUINTOS & HANSON, LLP

Daniel A. Geselowitz, Ph.D.
Agent for Applicants
Reg. No. 42,573

DAG/xl

Atty. Docket No. **050123**
Suite 400
1420 K Street, N.W.
Washington, D.C. 20005
(202) 659-2930

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